



Hyperloop Thoughts & Ideas

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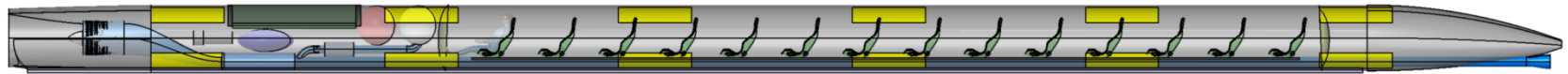
Thoughts on Fuselage Structure

- Limited interior space makes an aircraft like central exit/ entry difficult
- Limited cross section limits space for dedicated structural elements, hence a self carrying shell structure is favorable
- A single large door would significantly weaken the structure (hence heavy)
- Round or ellipsoidal cross section (aircraft type) presents a weight optimum for a pressurized cabin
- Possible rear exit (sliding type)

Fuselage loads

- Internal pressure
- Acceleration
- Buckling
- Bending moments
- Local loads

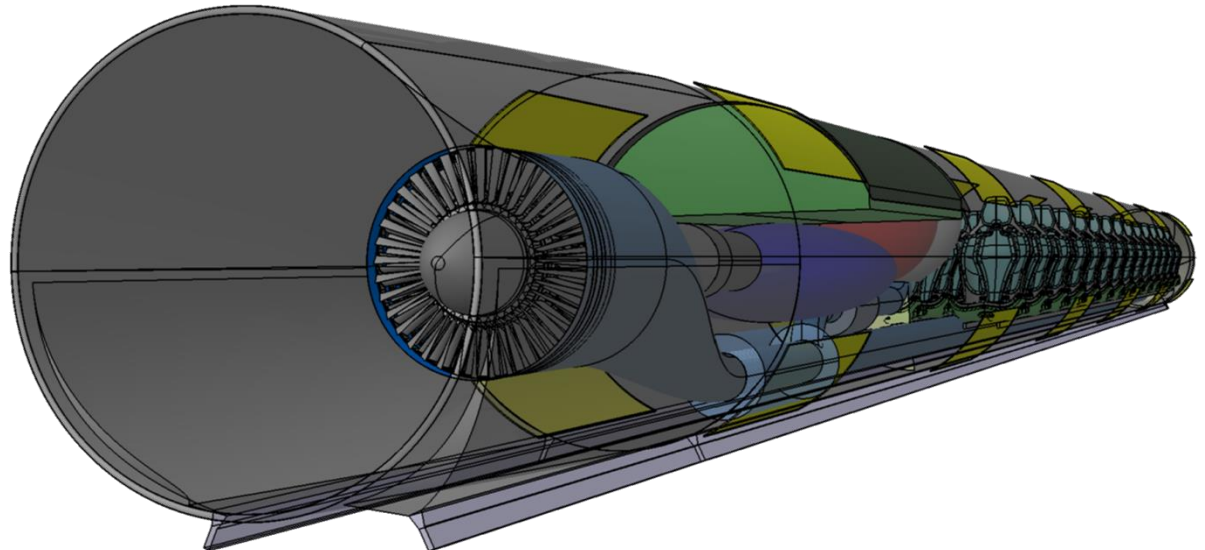
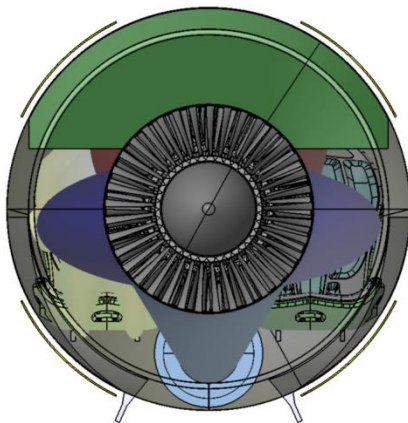
Overview



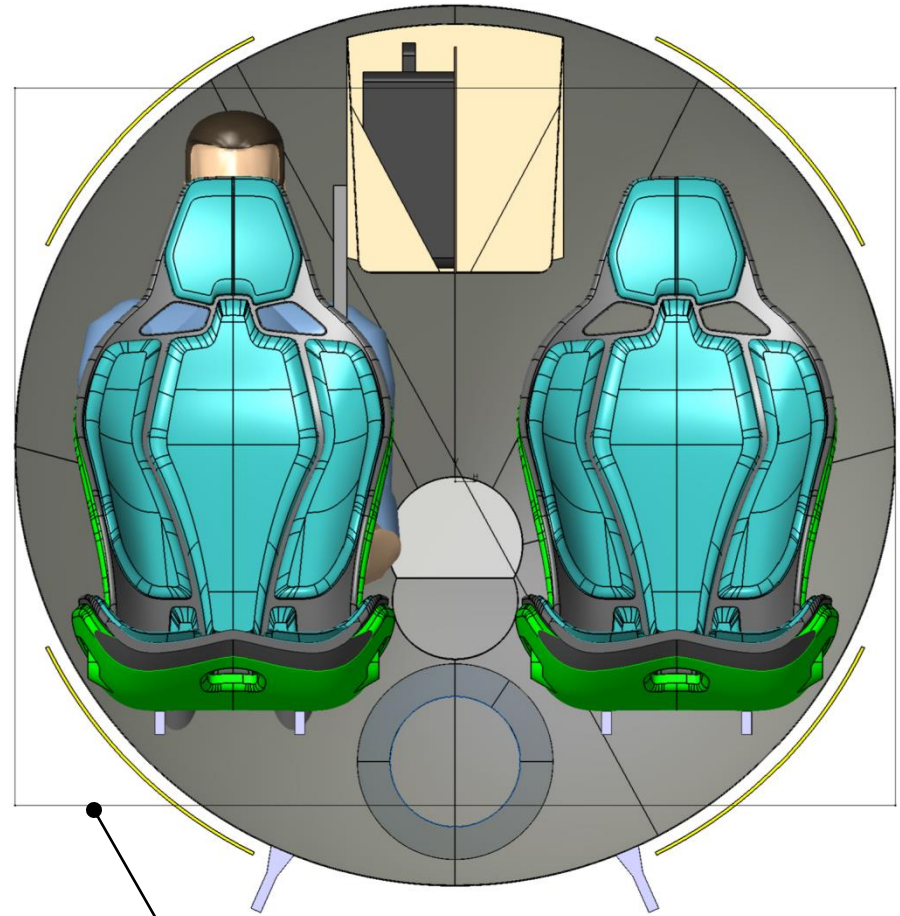
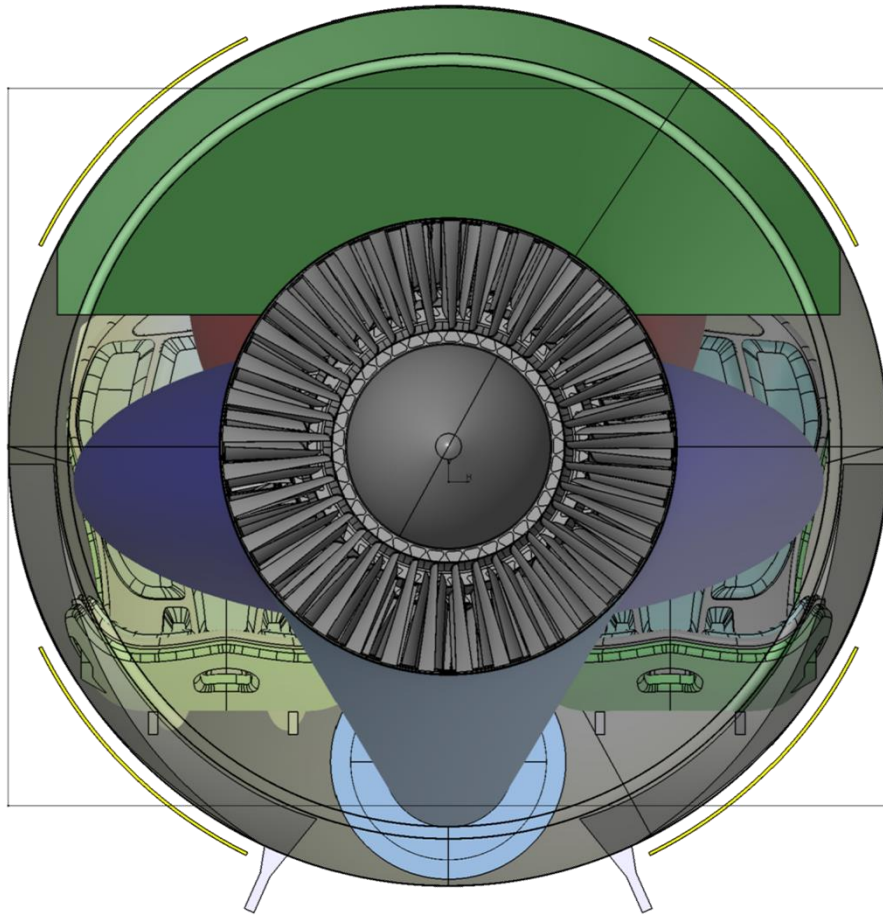
Propulsion section
(C.G. problem?)

Passenger section

Rear section

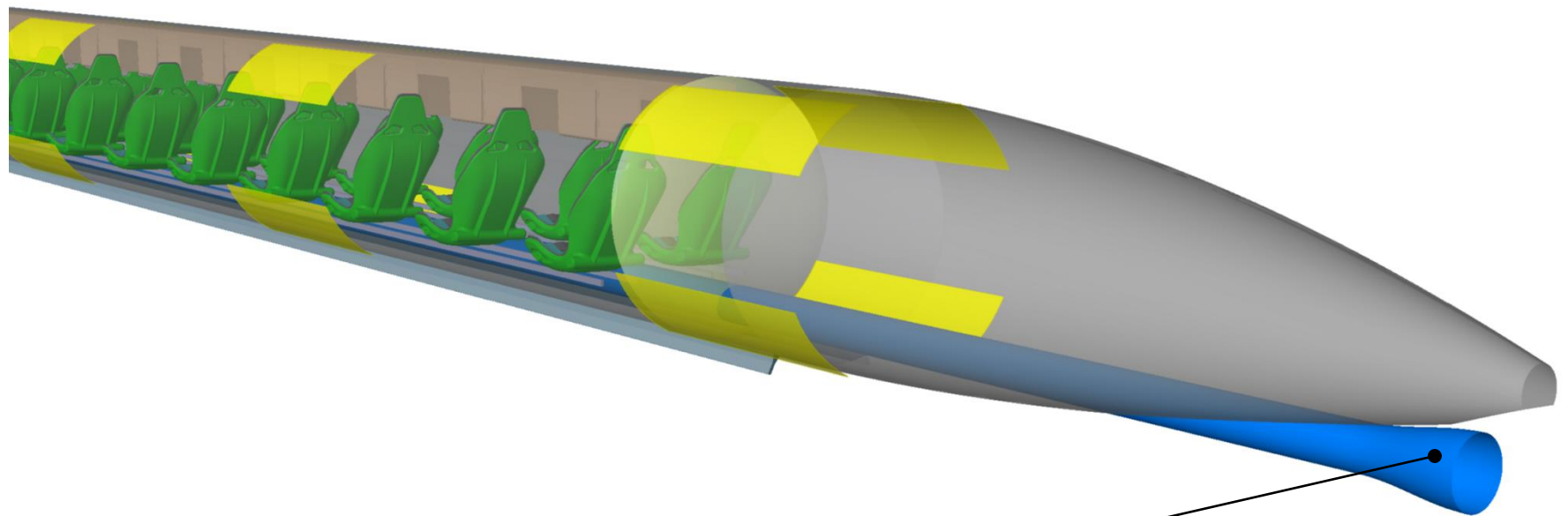


Cross section



- Initial cross section from 'Alpha' study
- Cross section may be further optimized

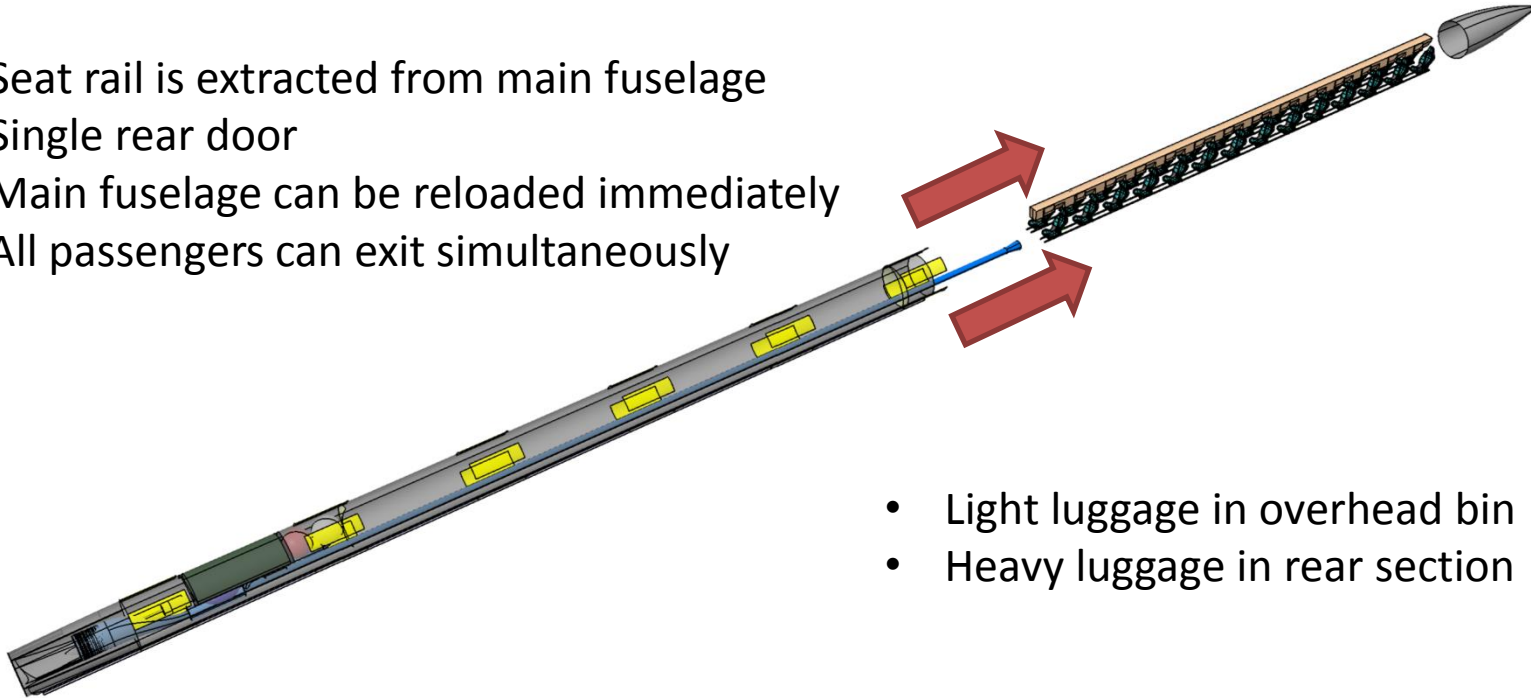
Rear Section



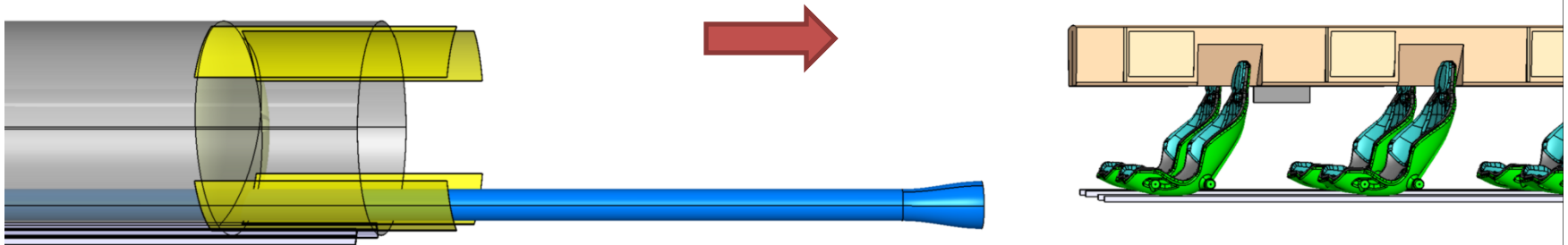
Expansion nozzle

Unloading

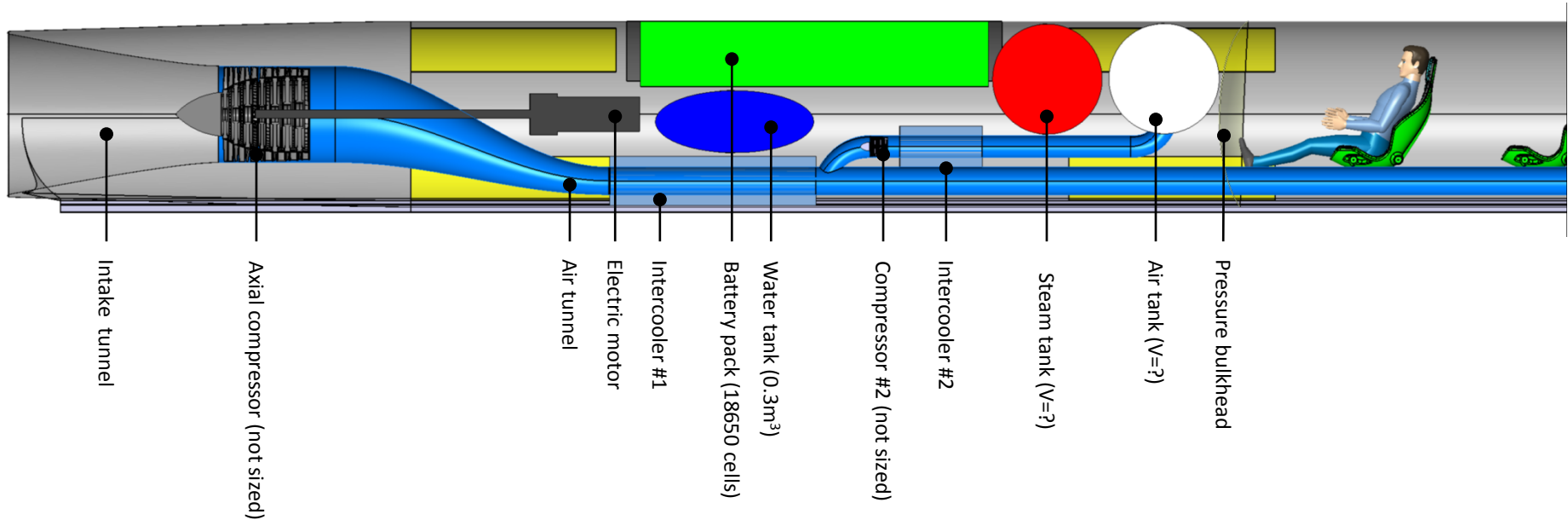
- Seat rail is extracted from main fuselage
- Single rear door
- Main fuselage can be reloaded immediately
- All passengers can exit simultaneously



- Light luggage in overhead bin
- Heavy luggage in rear section

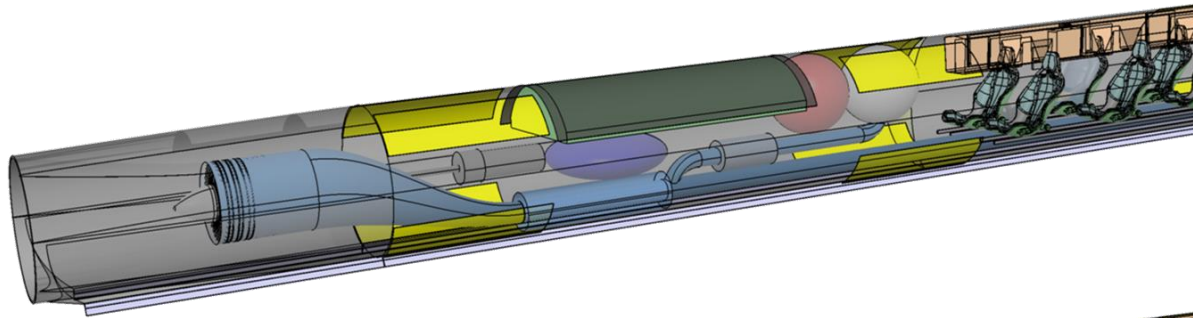


Engine Unit

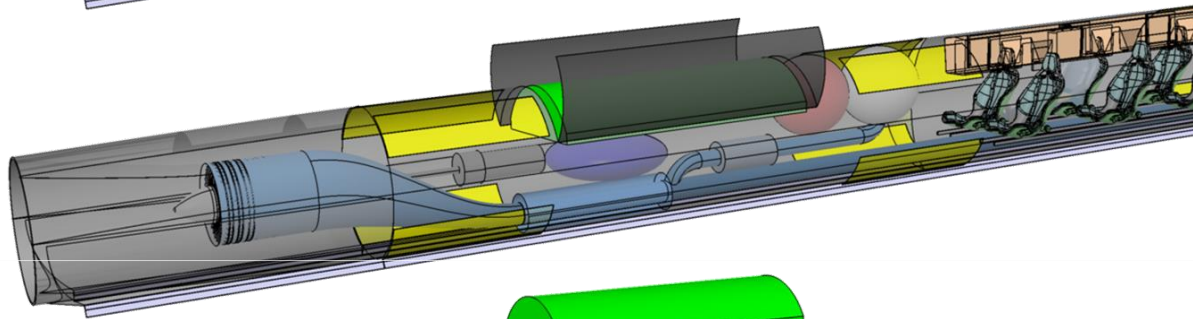


- Volumes according to alpha study
- Battery pack place to be extractable between air bearings
- Pressurized tanks should be relocated away from passengers (possibly exchange with battery pack)

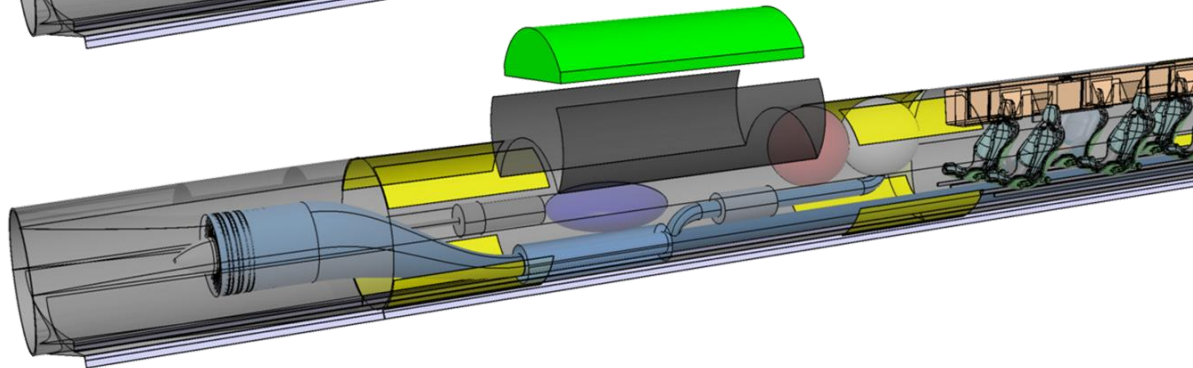
Battery Replacement



1. Doors are unlocked

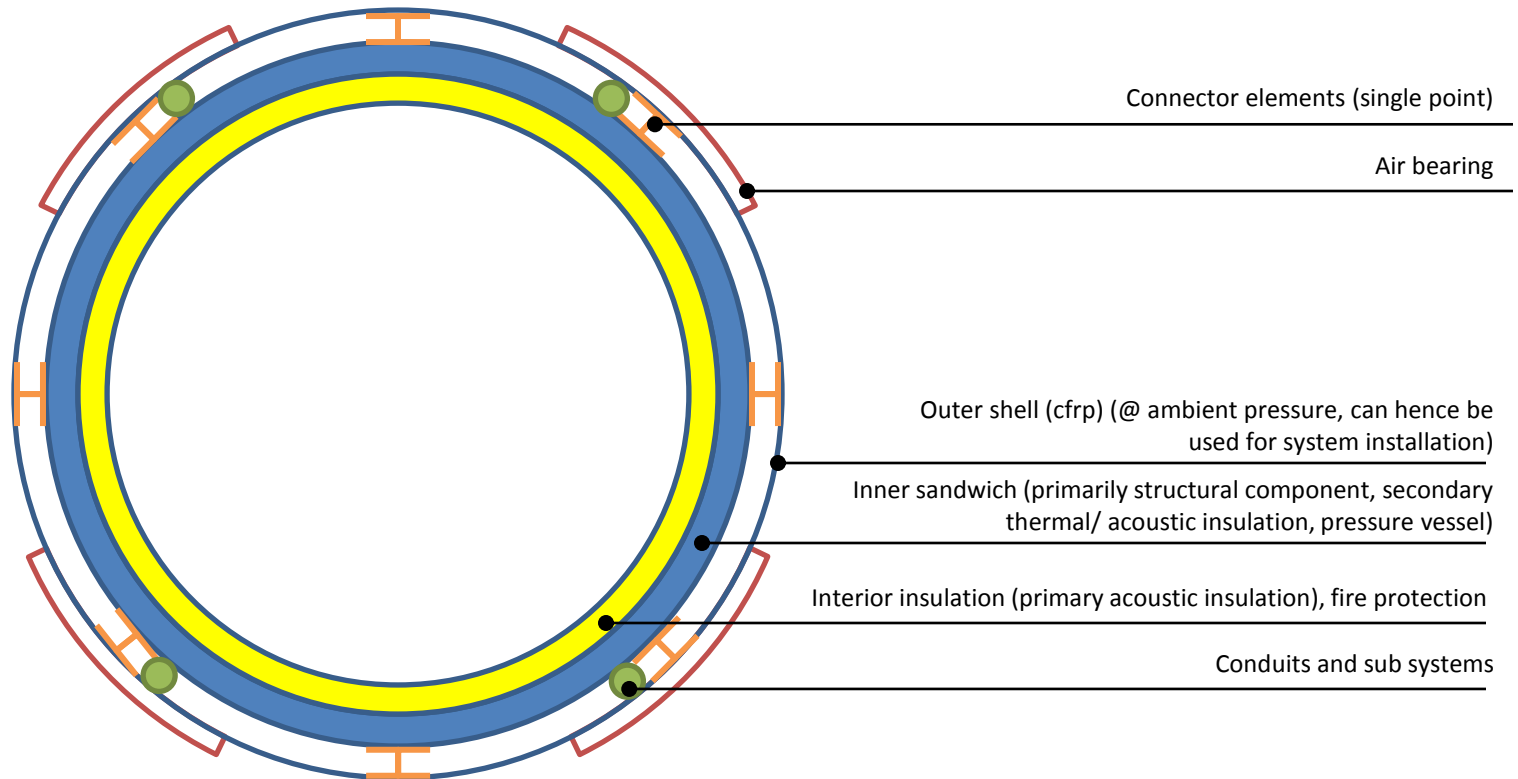


2. Doors are opened



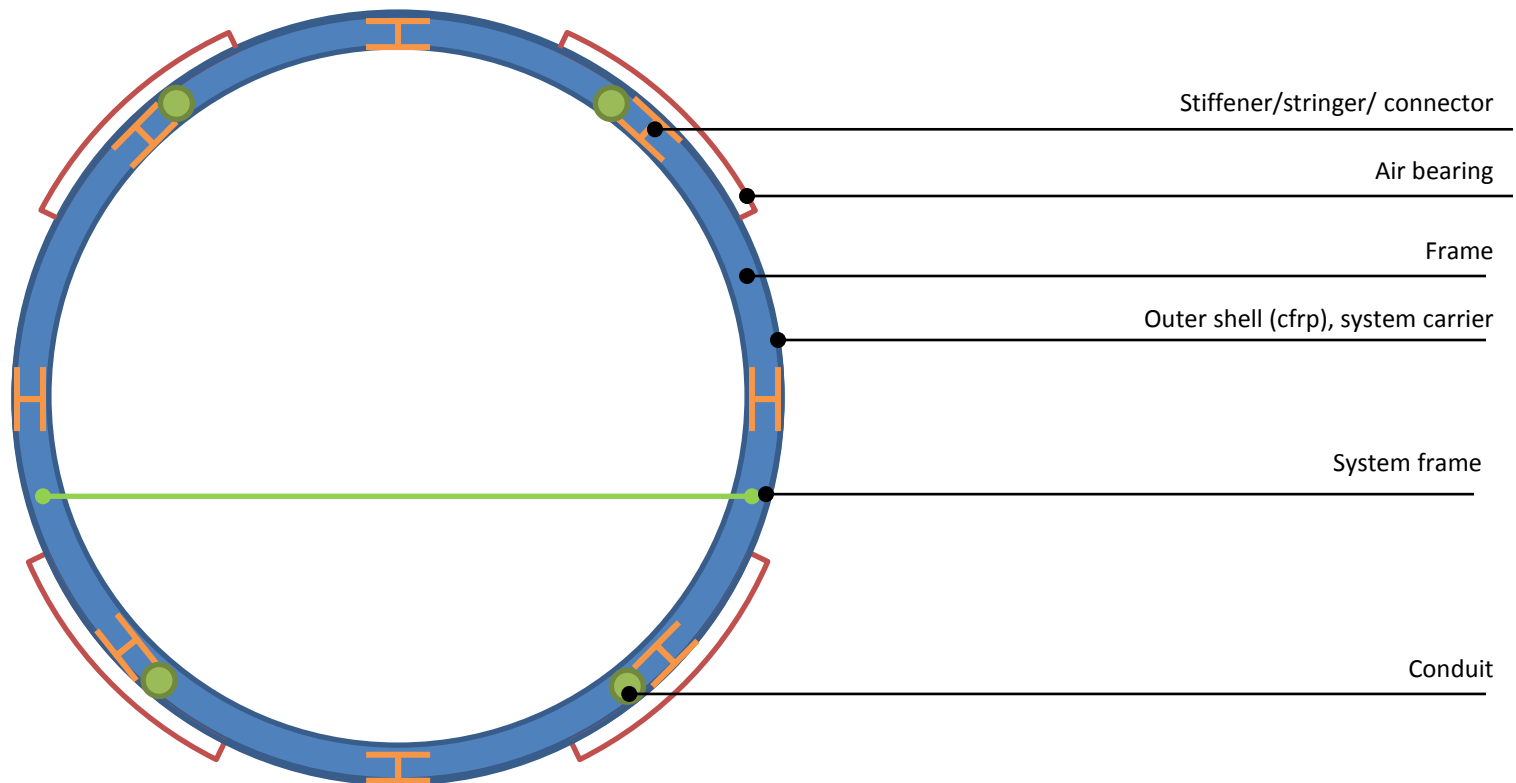
3. Pack is unloaded

Passenger Cabin Cross Section



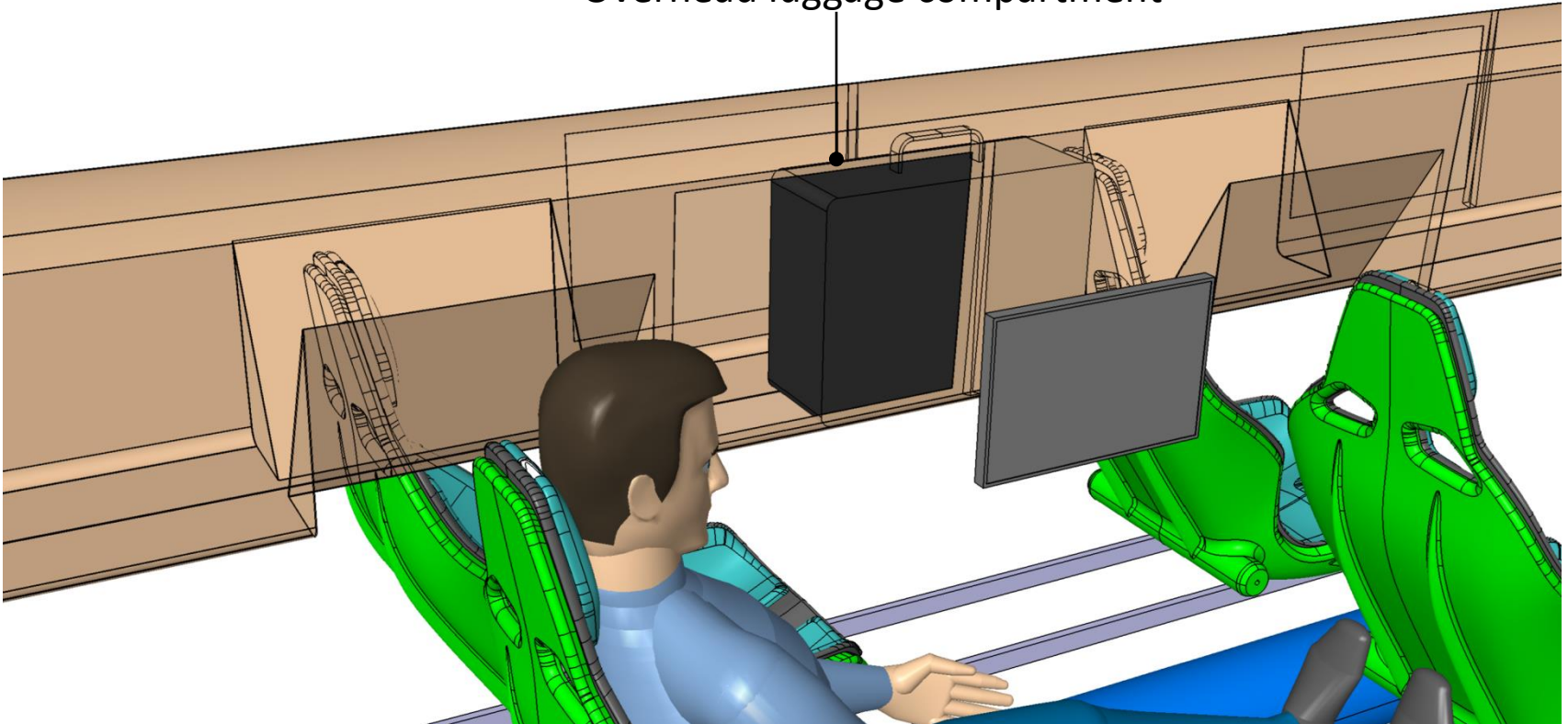
Why round (or close to round)? Mainly due to internal pressure.

Propulsion Unit Cross Section



Luggage

Overhead luggage compartment

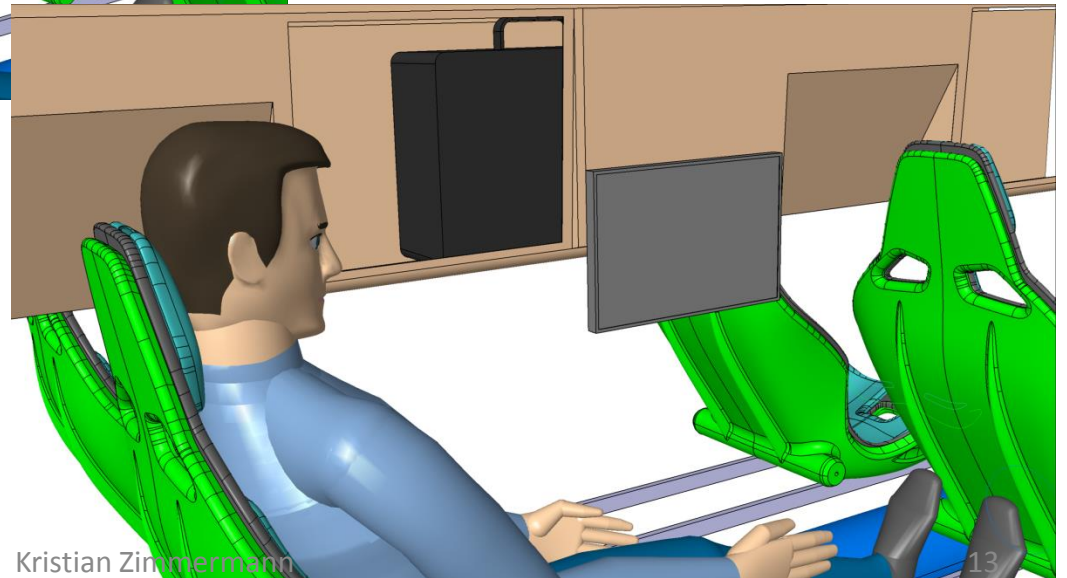


- Seat type will create problems for non standard PAX
- Low seat arrangement for minimum cross section

Screen/ Entertainment



Folding touchscreen





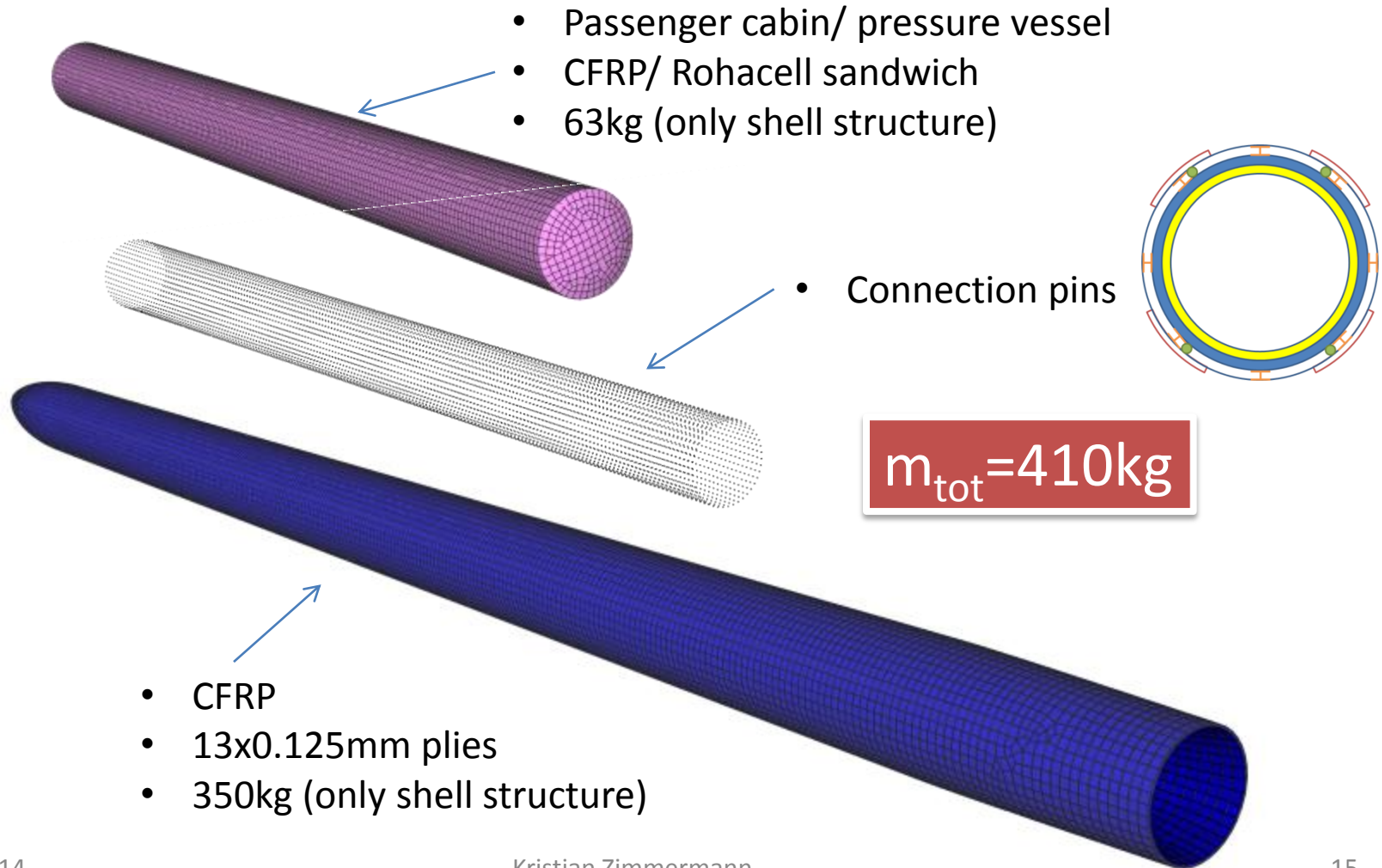
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FEA supplement

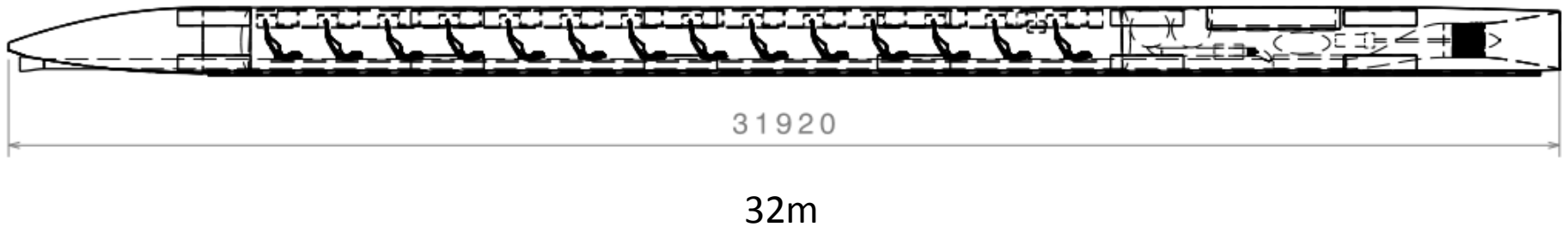
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FEA @ Internal Pressure

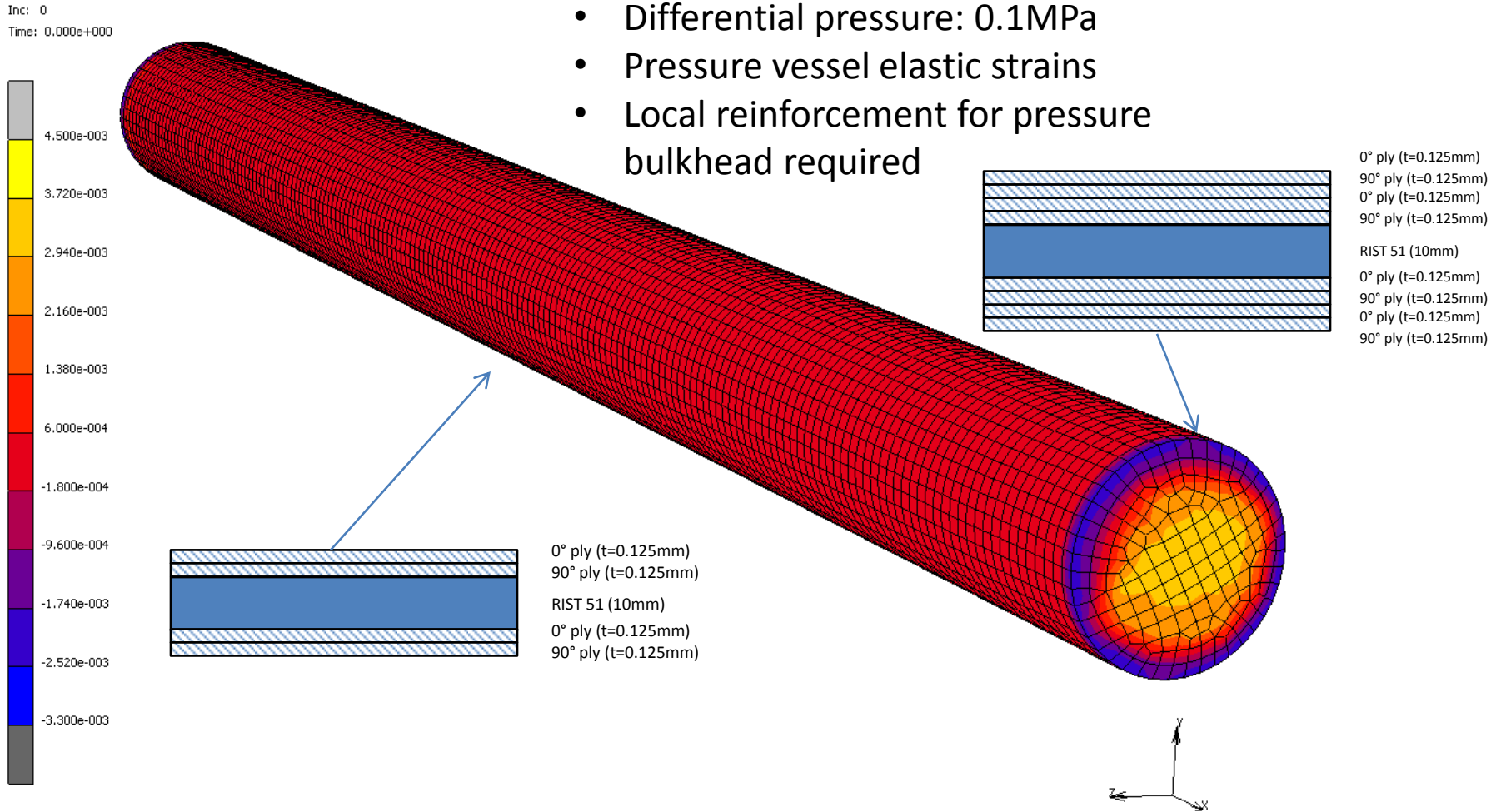


Length



(strain 11, ply1)

- Differential pressure: 0.1MPa
- Pressure vessel elastic strains
- Local reinforcement for pressure bulkhead required

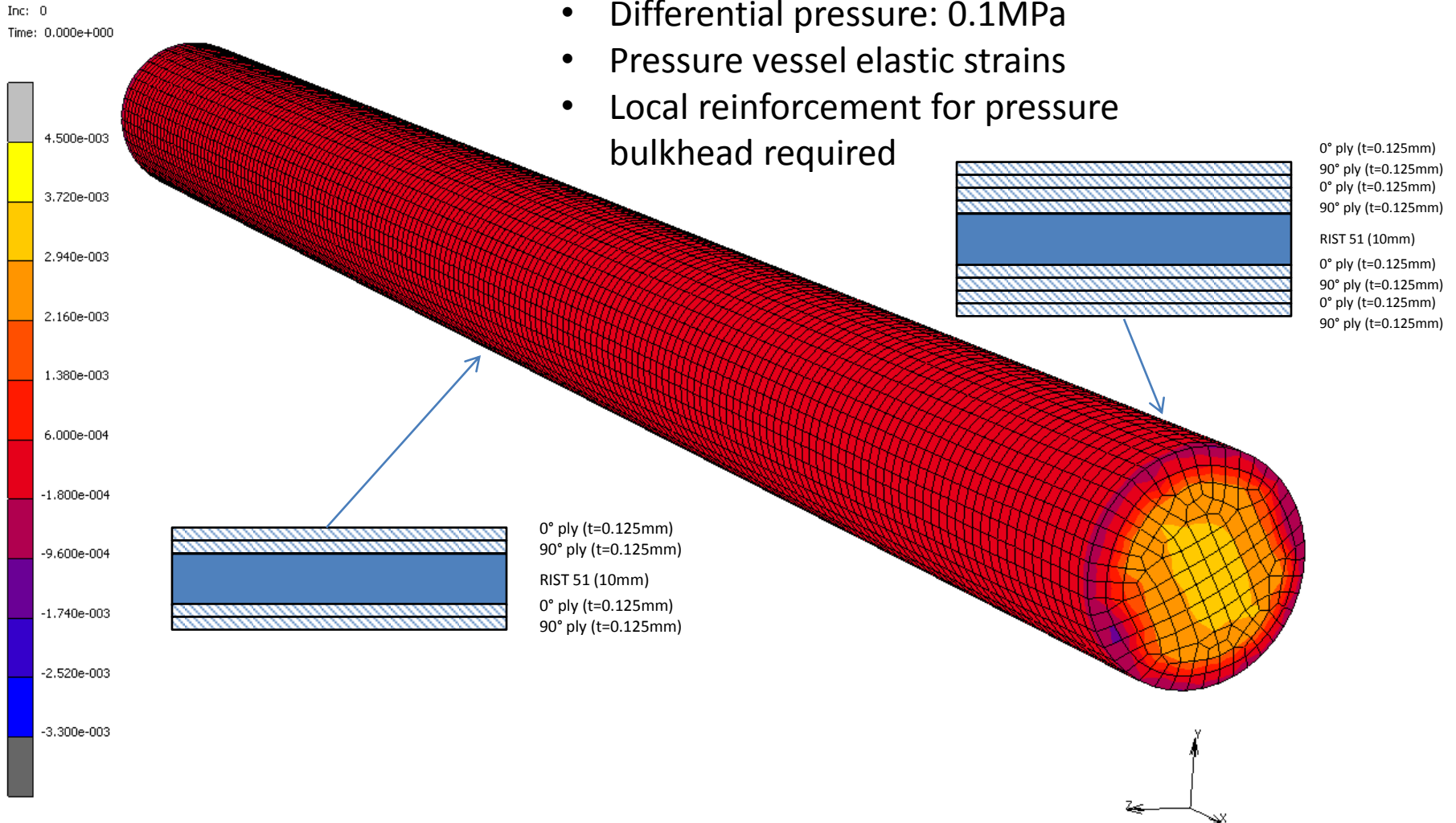


job 1

Comp 11 of Elastic Strain in Preferred Sys Layer 1

Internal Pressure , Passenger Cabin (strain 22, ply1)

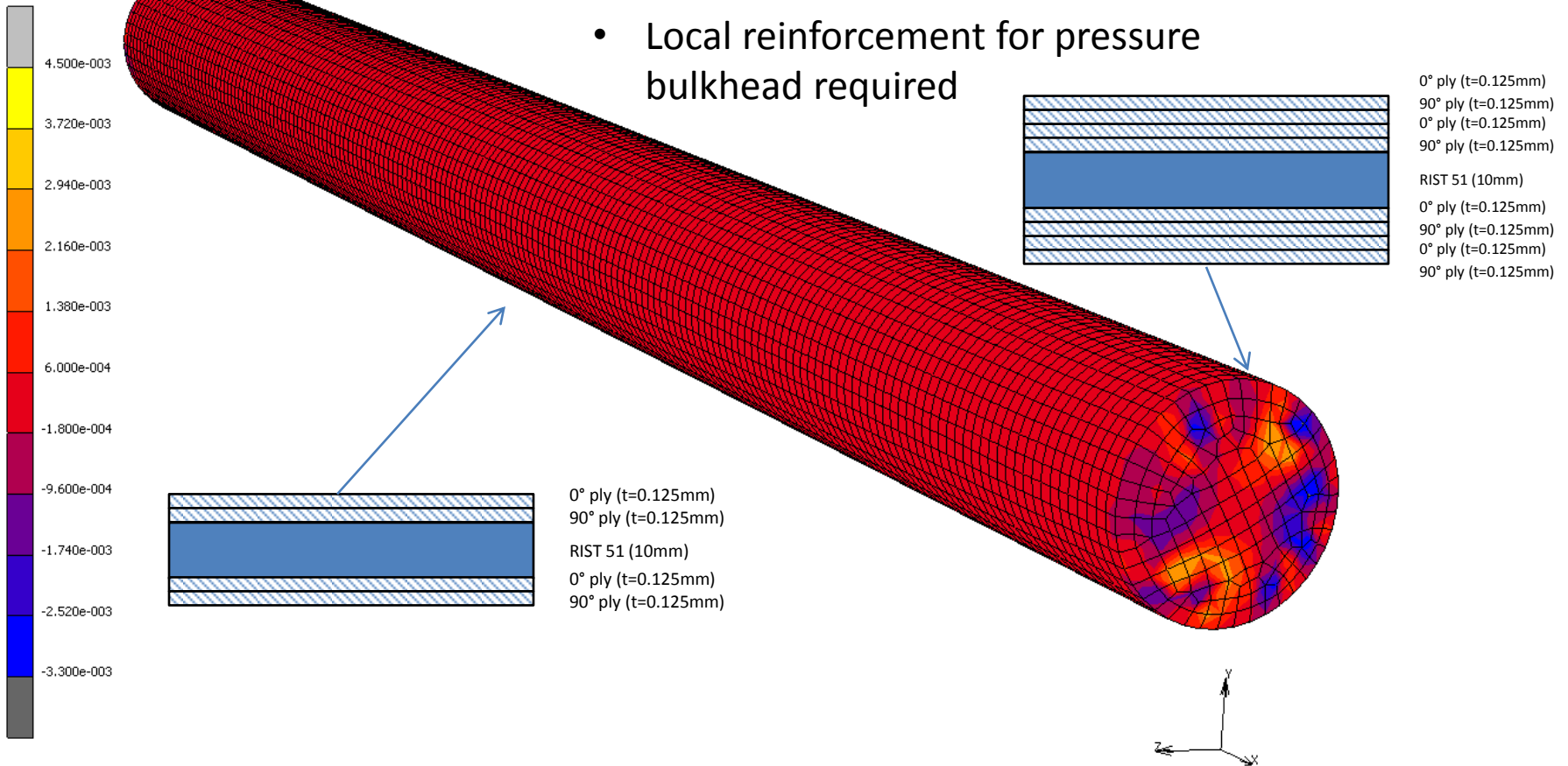
- Differential pressure: 0.1MPa
- Pressure vessel elastic strains
- Local reinforcement for pressure bulkhead required



Internal Pressure, Passenger Cabin (strain 12, ply1)

Inc: 0
Time: 0.000e+000

- Differential pressure: 0.1MPa
- Pressure vessel elastic strains
- Local reinforcement for pressure bulkhead required



job1

Comp 12 of Elastic Strain in Preferred Sys Layer 1

Internal Pressure, Ext. Shell (strain 11,22,12, ply1)

